IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s): G. Grabarnik et al.
Docket No.: YOR920010748US1
Serial No.: 09/976,543
Filing Date: October 12, 2001
Group: 2142
Examiner: Kelvin Y. Lin

Title: Systems and Methods for Validation, Completion and Construction of Event Relationship Networks

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REPLY BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The remarks which follow are submitted in response to the Examiner's Answer dated July 2, 2007 in the above-identified application. The arguments presented by Appellants in the corresponding Appeal Brief are hereby incorporated by reference herein.

Claims 1, 3, 14, 16 and 27 are rejected under 35 U.S.C. §103(a) as being unpatentable over D. Mishra, "SNOOP: An Event Specification Language for Active Database System," Thesis from University of Florida, 1991 (hereinafter "Mishra") in view of U.S. Patent No. 6,006,213 issued to Yoshida (hereinafter "Yoshida").

In response to Appellants' arguments, the Examiner alleges "it is clear that an ERN, or event relationship network, is an event graph," (Examiner's Answer, page 12, last paragraph). Assuming for the sake of argument only that the event graph of Mishra discloses an ERN, Mishra still fails to teach or suggest the limitations of claim 1. The event graph of Mishra is not an event relationship network that can be used to construct one or more correlation rules for use by a correlation engine in an event management system, as in the claimed invention.

The Examiner refers to Yoshida at column 2, lines 45-49 as teaching or suggesting utilizing the one or more generated event relationship networks to construct one or more correlation rules. Yoshida at column 2, lines 45-48 states as follows: "the extracted patterns are converted into rules

for classification or rules for high-speed operation in accordance with a kind of the input graph and are then output." The extracted patterns of Yoshida do not teach or suggest the claimed event relationship network. Neither classification nor high-speed operation rules teach or suggest the claimed one or more correlation rules for use by a correlation engine. Thus, the Yoshida reference fails to supplement the above-noted deficiencies of Mishra as applied to claim 1. Accordingly, it is believed that the combined teachings of Mishra and Yoshida fail to meet the limitations of claim 1.

In response to Appellants' arguments, the Examiner provides the following statement of motivation beginning at page 14, first paragraph of the Examiner's Answer:

> It is noted however, that a motivation was provided that demonstrated that additional functionality would be found by combining Mishra with Yoshida. The teachings of Yoshida allow analysis to be performed on the graphs that were disclosed in Mishra, the analysis being useful for the development of a knowledge base, as per Yoshida, column 1, lines 34-65.
>
> Further, it is noted that the obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so, but the teaching, suggestion, or motivation may be found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Appellants respectfully submit that these are conclusory statements of the sort rejected by both the Federal Circuit and the U.S. Supreme Court. See KSR v. Teleflex, No. 13-1450, slip. op. at 14 (U.S., Apr. 30, 2007), quoting In re Kahn, 441 F. 3d 977, 988 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."). There has been no showing in the present §103(a) rejection of claim 1 of objective evidence of record that would motivate one skilled in the art to combine Mishra and Yoshida to produce the particular limitations in question. The above-quoted statement of motivation provided by the Examiner appears to be a conclusory statement of the type ruled insufficient in KSR v. Teleflex.

Regarding claims 3 and 16, it is still not clear how "Read rule_definition" in Mishra teaches or suggests obtaining one or more previously generated event relationship networks. (Mishra, page 57, line 10). As noted in Appellants' Appeal Brief, event relationship networks are graphical representations of how events are correlated. At page 57 of Mishra, a rule is the input for the graph building algorithm, and not an event relationship network. It is also not clear how the fact that Mishra describes "Define trees (i.e. nodes) corresponding to rule_event1 and rule_event2 in the forest" teaches or suggests validating the one or more previously generated event relationship networks by removing any nodes or links included therein that are incorrect for a particular application context. Furthermore, despite the Examiner's Answer, it is still not clear how "build_tree" of Mishra discloses the step of completing the one or more previously generated event relationship networks by adding any nodes or links thereto that are missing for the particular application context. Lastly, "Create Rule_b" and "merge it in the event_forest" of Mishra do not teach or suggest outputting the one or more validated and completed event relationship networks as the one or more event relationship networks used to construct the one or more correlation rules.

Claims 2 and 15 are rejected as being unpatentable under 35 U.S.C. §103(a) over Mishra in view of Yoshida in further view of U.S. Patent No. 5,345,380 issued to Babson et al. (hereinafter "Babson").

Appellants again assert that claims 2 and 15, which depends from claims 1 and 14 respectively, are patentable over the Mishra/Yoshida/Babson combination not only for the reasons given above with respect to claims 1 and 14, but also because such dependent claims recite patentable subject matter in their own right.

Appellants still assert that Babson does not disclose subjecting the one or more generated event relationship networks to human review prior to utilizing the one or more generated event relationship networks to construct the one or more correlation rules. Instead, the relied-upon portions of Babson refers to "presenting the customer with a plurality of types of nodes, the nodes indicating the determinations and actions allowable for the procedure; receiving from the customer indications of desired relationships between the desired nodes ...," which is not relevant to the rejection of the claimed features in claims 2 and 15.

It is also asserted that the motivation set forth by the Examiner to combine Babson with Mishra and Yoshida is insufficient under the KSR v. Teleflex decision (cited above).

Claims 4-7, 11, 13, 17-20, 24 and 26 are rejected as being unpatentable under 35 U.S.C. §103(a) over Mishra in view of Yoshida in further view of U.S. Patent No. 6,249,755 issued to Yemini et al. (hereinafter "Yemini").

Appellants again assert that claims 4-7, 11, 13, 17-20, 24 and 26, which depend from claims 1 and 14 respectively, are patentable over the Mishra/Yoshida/Yemini combination not only for the reasons given above with respect to claims 1 and 14, but also because such dependent claims recite patentable subject matter in their own right.

Claims 4 and 17 recite that the validating and completing steps utilize a statistical correlation analysis. The cited portions of Yemini refer to generating a well-formed correlation matrix. However, they do not teach or suggest the claimed features of claims 4 and 17.

Claims 5 and 18 recite that the statistical correlation analysis utilizes pairwise correlation analysis, wherein correlation between a pair of events is measured in accordance with one or more statistical measurements. It is still not clear how the correlation matrix including pairs of the form {Pr,t) where Pr is a probability indication, as disclosed in Yemini, teaches or suggests the claimed features of claims 5 and 18.

Regarding claims 6 and 19, despite the Examiner's Answer, it is still not clear how applying a filter to remove weakly correlated data after correlations among events are stored in data file teaches or suggests for a particular event relationship network, determining that links in the event relationship network have a confidence level not less than a given threshold.

Claims 7 and 20 recite "splitting the event relationship into correlation paths; for every correlation path, removing a node that has the least number of correlated nodes associated therewith...; and merging correlation paths into one or more event relationship networks..." It is not clear how the features specifically defined in claims 7 and 20 could be taught or suggested by the cited portions of Yemini.

It is also asserted that the motivation set forth by the Examiner to combine Yemini with Mishra and Yoshida is insufficient under the KSR v. Teleflex decision (cited above).

Claims 8-10, 12, 21-23 and 25 are rejected as being unpatentable under 35 U.S.C. §103(a) over Mishra in view of Yoshida in view of Yemini in further view of Bettini et al., "Testing Complex Temporal Relationship Involving Multiple Granularities and Its Application to Data Mining," ACM 1996 (hereinafter "Bettini").

Appellants again assert that claims 8-10, 12, 21-23 and 25, which depend from claims 1 and 14 respectively, are patentable over the Mishra/Yoshida/Yemini/Bettini combination not only for the reasons given above with respect to claims 1 and 14, but also because such dependent claims recite patentable subject matter in their own right.

Regarding claims 8 and 21, it is still not clear how Bettini at page 73, Figure 2, discloses "utilizing the mined patterns to construct the one or more event relationship networks." Bettini at page 73, Figure 2 illustrates a TAG "which are essentially standard finite automata with the modification that transitions are conditioned not only by input symbols, but also by the values of the associated clock," not one or more event relationship networks. (Bettini, page 68, column 2, line 40 through page 69, column 1, line 2).

With regard to claims 9 and 22, it is still not clear how the recited portions of Bettini teach or suggest the claimed features of utilizing a statistical correlation analysis to mine patterns. The relationship between X_1 and X_0 dictating that the event assigned to X_0 must happen during the first month of a year does not disclose the claimed features of claims 9 and 22.

Regarding claims 10 and 23, Bettini at page 71, Figure 1 does not teach or suggest of utilizing pairwise correlation analysis, wherein correlation between a pair of events is measured in accordance with one or more statistical measurements. Figure 1 of Bettini only shows two event structures, and no where does Figure 1 show the correlation between a pair of events measured in accordance with one or more statistical measurements.

It is also asserted that the motivation set forth by the Examiner to combine Bettini with Mishra, Yoshida and Yemini is insufficient under the KSR v. Teleflex decision (cited above).

Claims 28 and 29 are rejected as being unpatentable under 35 U.S.C. §103(a) over Mishra in view of U.S. Patent No. 6,108,698 issued to Tenev (hereinafter "Tenev").

Appellants again assert that claims 28 and 29, which depend from claim 1, are patentable over the Mishra/Tenev combination not only for the reasons given above with respect to claim 1, but also because such dependent claims recite patentable subject matter in their own right.

Appellants added, in the response dated February 10, 2006, new claims 28 and 29. In the final Office Action, the Examiner introduces the Tenev reference in combination with Mishra to reject new claims 28 and 29. In particular, the final Office Action points to column 9, lines 32-45, of Tenev to reject claim 28 and column 13, lines 28-39, of Tenev to reject claim 29.

Column 9, lines 32-45, of Tenev read:

> FIG. 6 illustrates features of directed graph data structure 330 that are relevant to the operations performed by grapher routines 320 in relation to the expansion flags.
>
> Identifier (ID) mapping structure 350 maps from element IDs to pointers. The element IDs include node IDs and link IDs. Structure 350 makes it possible for every node and link in memory to be specified by an ID which can be validated in constant time and nearly always created in constant time; structure 350 avoids the need to use pointers except within directed graph data structure 330. Although implemented as two arrays of pointers, one indexed by the node IDs and the other by link IDs, structure 350 could also be, for example, a lookup table in which each entry includes an ID and a pointer.

Appellants agin assert that no where does this portion of Tenev or any other portion of Tenev teach or suggest computing a first correlation metric and a second correlation metric, the second correlation metric being representative of a correlation between events that is stronger than a correlation between events represented by the first correlation metric, as in claim 28. In fact, Appellants fail to see any discussion whatsoever in Tenev regarding such correlation metrics.

Further, column 13, lines 28-39, of Tenev read:

> FIG. 9 shows a sequence of representations of the graph shown in box 202 in FIG. 4 that could be presented as a result of operations like those described above in relation to FIG. 7, without creating or removing any nodes. Each representation could result from a respective iteration in FIG. 7, either an iteration through boxes 364 through 382 in response to an expand signal or an iteration through boxes 390

> and 392 in response to a contract signal. In each representation, a node feature with a "+" indicates that the represented node is contracted in the tree, while a node feature with a "-" indicates that the represented node is expanded in the tree.

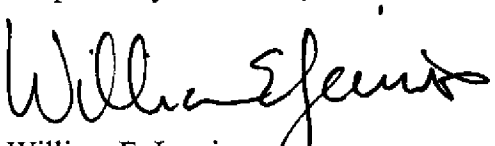
No where does this portion of Tenev or any other portion of Tenev teach or suggest specifying an event data window within which event data is considered, as in claim 29. The "+" and "-" mentioned above in Tenev relate to the graph itself and not to any event data or an event data window within which event data is considered, as claimed.

The Examiner points to column 6, line 51 through column 7, line 6 of Tenev as disclosing the limitations of claim 28. However, these cited portions of Tenev also fail to teach or suggest computing a first correlation metric and a second correlation metric, the second correlation metric being representative of a correlation between events that is stronger than a correlation between events represented by the first correlation metric, as recited in claim 28. With regard to claim 29, the Examiner again refers to column 9, lines 32-45 and FIG. 6 of Tenev as disclosing the limitations of claim 29. As noted above, no where does this portion of Tenev or any portion of Tenev teach or suggest the limitations as recited in claim 29.

It is also asserted that the motivation set forth by the Examiner to combine Tenev with Mishra is insufficient under the KSR v. Teleflex decision (cited above).

In view of the above, Appellants believe that claims 1-29 are in condition for allowance, and respectfully request withdrawal of the §103(a) rejections.

Respectfully submitted,



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